

# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter I of the Patent Cooperation Treaty)

(PCT Rule 44bis)

Applicant's or agent's file reference 0344/04/PCT	<b>FOR FURTHER ACTION</b>		See item 4 below
International application No. PCT/EP2004/009729	International filing date ( <i>day/month/year</i> ) 01 September 2004 (01.09.2004)	Priority date ( <i>day/month/year</i> ) 03 September 2003 (03.09.2003)	
International Patent Classification (8th edition unless older edition indicated) See relevant information in Form PCT/ISA/237			
Applicant TECHNISCHE UNIVERSITÄT ILMENAU			

1. This international preliminary report on patentability (Chapter I) is issued by the International Bureau on behalf of the International Searching Authority under Rule 44 bis.1(a).

2. This REPORT consists of a total of 15 sheets, including this cover sheet.

In the attached sheets, any reference to the written opinion of the International Searching Authority should be read as a reference to the international preliminary report on patentability (Chapter I) instead.

3. This report contains indications relating to the following items:

- |                                     |   |
|-------------------------------------|---|
| <input checked="" type="checkbox"/> | Box No. I Basis of the report   |
| <input checked="" type="checkbox"/> | Box No. II Priority   |
| <input checked="" type="checkbox"/> | Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability  |
| <input checked="" type="checkbox"/> | Box No. IV Lack of unity of invention   |
| <input checked="" type="checkbox"/> | Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/>            | Box No. VI Certain documents cited  |
| <input checked="" type="checkbox"/> | Box No. VII Certain defects in the international application  |
| <input checked="" type="checkbox"/> | Box No. VIII Certain observations on the international application  |

4. The International Bureau will communicate this report to designated Offices in accordance with Rules 44bis.3(c) and 93bis.1 but not, except where the applicant makes an express request under Article 23(2), before the expiration of 30 months from the priority date (Rule 44bis .2).

Date of issuance of this report 26 September 2006 (26.09.2006)
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Authorized officer
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Ellen Moyse
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Form PCT/IB/373 (January 2004)
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**PATENT COOPERATION TREATY**

From the  
INTERNATIONAL SEARCHING AUTHORITY

To:

**PCT**

*TRANSLATION*

**WRITTEN OPINION OF THE  
INTERNATIONAL SEARCHING AUTHORITY**

(PCT Rule 43bis.1)

		Date of mailing (day/month/year)	<b>See form PCT/ISA/210</b>
<b>Applicant's or agent's file reference</b> <b>0344/04/PCT</b>		<b>FOR FURTHER ACTION</b> <small>See paragraph 2 below</small>	
International application No. <b>PCT/EP2004/009729</b>	International filing date (day/month/year) <b>01.09.2004</b>	Priority date (day/month/year) <b>03.09.2003</b>	
International Patent Classification (IPC) or both national classification and IPC <b>H01 L51/40, . H01 L51/20</b>			
Applicant <b>TECHNISCHE UNIVERSITÄT ILMENAU</b>			

1. This opinion contains indications relating to the following items:

- |                                     |              |  |
|-------------------------------------|--------------|--|
| <input checked="" type="checkbox"/> | Box No. I    | Basis of the opinion   |
| <input checked="" type="checkbox"/> | Box No. II   | Priority   |
| <input checked="" type="checkbox"/> | Box No. III  | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability   |
| <input checked="" type="checkbox"/> | Box No. IV   | Lack of unity of invention   |
| <input checked="" type="checkbox"/> | Box No. V    | Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/>            | Box No. VI   | Certain documents cited  |
| <input checked="" type="checkbox"/> | Box No. VII  | Certain defects in the international application   |
| <input checked="" type="checkbox"/> | Box No. VIII | Certain observations on the international application  |

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/EP	Authorized officer
Facsimile No.	Telephone No.

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Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.  
 This opinion has been established on the basis of a translation from the original language into the following language \_\_\_\_\_, which is the language of a translation furnished for the purposes of international search (under Rule 12.3 and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
  - a. type of material
    - a sequence listing
    - table(s) related to the sequence listing
  - b. format of material
    - in written format
    - in computer readable form
  - c. time of filing/furnishing
    - contained in the international application as filed.
    - filed together with the international application in computer readable form.
    - furnished subsequently to this Authority for the purposes of search.
3.  In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

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Box No. II      Priority	
<p>1. <input checked="" type="checkbox"/> The following document has not yet been furnished:</p> <p><input checked="" type="checkbox"/> copy of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(a)). <input type="checkbox"/> translation of the earlier application whose priority has been claimed (Rule 43bis.1 and 66.7(b)).</p> <p>Consequently it has not been possible to consider the validity of the priority claim. This opinion has nevertheless been established on the assumption that the relevant date is the claimed priority date.</p> <p>2. <input type="checkbox"/> This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43bis.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.</p> <p>3. Additional observations, if necessary:</p>	

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Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non obvious), or to be industrially applicable have not been examined in respect of:

- the entire international application  
 claims Nos. 2-4

because:

- the said international application, or the said claims Nos. \_\_\_\_\_ relate to the following subject matter which does not require an international preliminary examination (*specify*):

- the description, claims or drawings (*indicate particular elements below*) or said claims Nos. \_\_\_\_\_ are so unclear that no meaningful opinion could be formed (*specify*):

- the claims, or said claims Nos. \_\_\_\_\_ are so inadequately supported by the description that no meaningful opinion could be formed.

- no international search report has been established for said claims Nos. 2-4

- the nucleotide and/or amino acid sequence listing does not comply with the standard provided for in Annex C of the Administrative Instructions in that:

the written form

- has not been furnished  
 does not comply with the standard

the computer readable form

- has not been furnished  
 does not comply with the standard

- the tables related to the nucleotide and/or amino acid sequence listing, if in computer readable form only, do not comply with the technical requirements provided for in Annex C-bis of the Administrative Instructions.

- See Supplemental Box for further details.

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Box No. IV      Lack of unity of invention

1.  In response to the invitation (Form PCT/ISA/206) to pay additional fees the applicant has:  
 paid additional fees  
 paid additional fees under protest  
 not paid additional fees
2.  This Authority found that the requirement of unity of invention is not complied with and chose not to invite the applicant to pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is  
 complied with  
 not complied with for the following reasons:

**See Supplemental Box**
4. Consequently, this opinion has been established in respect of the following parts of the international application:  
 all parts  
 the parts relating to claims Nos. 1

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Box No. V	<u>Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</u>																												
<p><b>1. Statement</b></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">Novelty (N)</td> <td style="width: 50%;">Claims</td> <td style="width: 25%; text-align: right;">YES</td> </tr> <tr> <td></td> <td>1</td> <td></td> </tr> <tr> <td></td> <td>Claims</td> <td>NO</td> </tr> <tr> <td>Inventive step (IS)</td> <td>Claims</td> <td style="text-align: right;">YES</td> </tr> <tr> <td></td> <td>1</td> <td></td> </tr> <tr> <td></td> <td>Claims</td> <td>NO</td> </tr> <tr> <td>Industrial applicability (IA)</td> <td>Claims</td> <td style="text-align: right;">YES</td> </tr> <tr> <td></td> <td>1</td> <td></td> </tr> <tr> <td></td> <td>Claims</td> <td>NO</td> </tr> </table> <p><b>2. Citations and explanations:</b></p> <p><b>1. Clarity</b></p> <p>The application does not comply with PCT Article 6 because <b>claim 1 is unclear</b>.</p> <p><b>Claim 1</b> states that a photosensitive resist with overlapping edges is structured. The expression "<b>overlapping edges</b>" is unclear. A person skilled in the art does not know what technical features characterise the "overlapping edges" of a photosensitive resist. A person skilled in the art would ask how and with what the edges (which edges?) are supposed to overlap. The description does not give any indication on that point. For the purpose of the examination, it was assumed that "overlapping edges" are equivalent to shallowly inwardly inclined edges, as depicted in figure 1A.</p> <p><b>Claim 1 further introduces the process step of insulator etching</b>, "producing flat edges at the overlapping edges of the photosensitive resist as the reverse of said overlap". A person skilled in the art would not know what the finished product is supposed to look like, what are flat edges as the reverse of overlaps, for example. The description does not give any indication on that point.</p>			Novelty (N)	Claims	YES		1			Claims	NO	Inventive step (IS)	Claims	YES		1			Claims	NO	Industrial applicability (IA)	Claims	YES		1			Claims	NO
Novelty (N)	Claims	YES																											
	1																												
	Claims	NO																											
Inventive step (IS)	Claims	YES																											
	1																												
	Claims	NO																											
Industrial applicability (IA)	Claims	YES																											
	1																												
	Claims	NO																											

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Box No. V      Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

For the purpose of the examination, it was therefore assumed that the insulator layer is etched as depicted in figure 1C, i.e. that the insulator layer subsists in the overhanging photosensitive resist edges and stands out only directly adjoining the overhanging photosensitive resist edges, first flat over the upper metal tracks, then slanting with a semicircular shape.

Furthermore, the above-mentioned **feature represents a desired result**, or the problem addressed, and does not indicate the technical features necessary to achieve this result. Consequently, the subject matter for which protection is sought is not clearly defined.

**2. Documents**

This written opinion makes reference to the following document:

D1:      US 5 091 288 A (FEWER WILLIAM R ET AL), 25 February 1992 (1992-02-25)

**3. Novelty and inventive step**

D1 is regarded as the closest prior art and discloses (the references in parentheses are to that document):

in figure 6, an electronic component produced by the following process (see column 4):

- deposition of two photosensitive resist layers on a substrate;

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Box No. V      Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

- structuring of the uppermost photosensitive resist layer;
- resolving (developing) the underlying photosensitive resist layer, so that the edges are etched or bevelled underneath;
- applying a metallic layer both to the structured aperture and to the photosensitive resist layer.

The subject matter of independent claim 1 differs from that disclosure in that an insulating layer is applied in such a way that it fills only the bevelled zones.

The subject matter of claim 1 is thus novel (PCT Article 33(2)). No other international search report citation contains any indication of the application of an insulating layer as described in claim 1 (and figure 1C). Consequently, the subject matter of claim 1 is also inventive (PCT Article 33(3)).

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Box No. VII      Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

The present application **does not disclose the invention to a sufficient extent and does not include a best implementation mode**. The application therefore **does not comply with PCT Article 5 and PCT Rule 5.1(a) (v)**.

The invention as per claim 1 is described in only 16 lines in the description (page 3, line 25 – page 4, line 7), and no specific embodiment is included. This is not sufficient to allow a person skilled in the art to duplicate and implement the invention.

Claim 1 claims the bevelling of the edges of a photosensitive resist layer as depicted in figure 1A. A person skilled in the art cannot find any indication, besides the process step described in claim 1, on how to carry out this step, in particular what photosensitive resists can be used, in what conditions they should be etched in order to achieve the desired geometry, and how the electronic component is to be subsequently produced. This process can be expected to require special materials and process steps. It is left to a person skilled in the art to find them out by himself, through laborious experimenting.

Claim 1 further describes a process step in which an insulating layer is applied, then etched in such a way (see figure 1C) that a special profile is produced in which portions of the insulating layer are flattened at the top then project downwards with a semicircular shape into the open zone. Again, a person skilled in the art can find no indication in the description on how to

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Box No. VII      Certain defects in the international application

select the conditions for the etching process in order to achieve this special profile. This feature thus represents a desired result, yet no features are specified on how to achieve it. It is left again to a person skilled in the art to find out by himself the alleged invention through laborious experimenting. This contravenes PCT Article 5 (and also PCT Rule 5.1 and the corresponding Guidelines).

The International Searching Authority is of the opinion that **this defect cannot be remedied** without causing the subject matter of the thus remedied application to go beyond the original disclosure in the application as initially filed, and thus to contravene PCT Article 19.

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**Box No. VIII      Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**See Box V**

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Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

**BOX IV.3**

**Lack of unity of invention**

**1. Invention as per claim 1**

Process for producing an electronic component, the process being characterised in that a photosensitive resist is structured, its edges are bevelled so as to stand out, and then an insulator is introduced exclusively into these bevelled zones.

**2. Invention as per claims 2-4**

Process for producing an electronic component, the process being characterised in that a photosensitive resist is applied to a metallic layer and structured, the metallic layer is etched accordingly, then additionally etched under the photosensitive resist. After an additional metallic layer is deposited, the photosensitive resist is peeled off, together with the metallic layer adhering thereto.

**3. Argument**

Contrary to PCT Rule 13.1, the inventions are not so linked as to form a single inventive concept:

PCT Rule 13.1 stipulates that the international application must relate to one invention only or to a group of inventions so linked as to form a single general inventive concept. PCT Rule 13.2 further stipulates that the requirement of unity of invention is only met when there is a technical relationship among those inventions

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Supplemental Box

involving one or more of the same or corresponding special technical features, which are the features which, considered as a whole, make a contribution over the prior art.

*A priori*, the special technical features are as follows:

Invention 1: inward bevelling of a photosensitive resist layer and introduction of an insulating material into the bevelled zones.

Invention 2: structuring of a metallic layer by means of a photosensitive resist, etching of the metallic layer under the photosensitive resist, and deposition of another metallic layer.

The only recognisable common special technical feature could be the result of the two inventions, namely the structuring of electrodes by etching underneath layers of photosensitive resist. However, this technical feature is already known from US5091288 (figure 6, metallic layers 25 and 27, photosensitive resist layers 15 and 19) and from EP0718877 (figure 2, aperture 26a in the photosensitive resist layer 26).

The technical feature represented by the structuring of electrodes by etching underneath layers of photosensitive resist is thus not novel and does not represent a contribution over the prior art, thus contravening PCT Rule 13.2. Consequently, the two inventions share no common inventive concept which could establish unity of invention under PCT Rule 13.1.

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Supplemental Box

The application relates to a plurality of inventions within the meaning of PCT Rule 13.1. These inventions have been divided into the above-mentioned groups. Should the applicant pay additional fees for the invention which at present has not yet been searched, the additional search might uncover additional prior art documents which might demonstrate an additional lack of unity of invention *a posteriori* among these inventions. In that case, only the first invention within that group of inventions determined to lack unity of invention would be the subject of a search. No further invitation will be issued to pay additional fees, since PCT Article 17(3) stipulates that the International Searching Authority should establish the international search report on those parts of the international application which relate to the invention first mentioned in the claims ("main invention") and on those parts which relate to inventions in respect of which additional fees were paid. Neither the Patent Cooperation Treaty nor the PCT Guidelines furnish any legal basis for an additional invitation to pay additional search fees (W17/00, point 11, and W1/97, points 11-16).